

REMARKS/ARGUMENTS

Claims 1–33 are pending in the application, and all of those claims have been rejected. In this Amendment and Response, claims 26 and 27 are amended, and a new claim 63 is added.

I. Claim Objections

Claims 26 and 27 were objected to. Applicants have amended the offending claims to include the word “further” before “comprising” as directed by the Examiner.

II. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645

Claims 1–6, 8–11, 14, and 19–33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 (“Knapp”) in view of Yon-Hin et al. US 6,440,645 (“Yon-Hin”). This rejection is traversed. To warrant rejection under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. See MPEP § 2142.

With regard to Applicants’ claim 1, at a minimum, neither Knapp nor Yon-Hin teaches or suggests “flowing a reaction mixture comprising an enzyme, an enzyme substrate, and a product through a separation region of the microfluidic device under an applied pressure, which separation region comprises at least one ion-exchange material, to separate the product from at least one other material based upon a net charge difference between the product and the at least one other material to produce separated materials.”

As noted by the Examiner on page 6 of the Office action, Knapp does not teach separation means comprising ion-exchange material. Knapp also does not teach flowing an enzyme, an enzyme substrate, and a product through a separation region. While Knapp indicates on page 43, lines 28–30, that enzymes and substrates may be sampled and assayed in an integrated system of the invention, no method is described for such an assay. Further, Knapp teaches away from flowing a reaction mixture under an applied pressure. “Although microfabricated fluid pumping and valving systems are readily employed in the devices of the invention, the cost and complexity associated with their manufacture and operation can generally

prohibit their use in mass-produced and potentially disposable devices as are envisioned by the present invention.” *See* page 71, lines 30–33.

This negative statement regarding pumping systems in microfluidic devices would discourage a person of ordinary skill in the art from combining the teachings of Knapp with the teachings of Yon-Hin regarding chromatography. “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” *See* MPEP § 2143.01 and *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). In addition, Yon-Hin does not teach “flowing a reaction mixture comprising an enzyme, an enzyme substrate, and a product through a separation region of the microfluidic device.” Rather, Yon-Hin teaches performing ion-exchange chromatography by attaching either the enzyme or the enzyme substrate to the inner walls of the separation region. *See* col. 5, lines 20–25. Therefore, the reaction mixture flowed through the region will comprise an enzyme or an enzyme substrate but not both.

Thus, the combination of Knapp and Yon-Hin neither teaches nor suggests all the claim limitations of Applicants’ independent claim 1. Further, neither reference contains any teaching or suggestion supporting the combination. Therefore, withdrawal of the rejection of independent claim 1 as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,64 is respectfully requested.

Claims 2–6, 8–11, 14, and 19–33 depend directly or indirectly from independent claim 1. Any claim depending from a nonobvious claim is also nonobvious. *See* MPEP § 2143.03 and *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, dependent claims 2–6, 8–11, 14, and 19–33 are nonobvious. Withdrawal of the rejections of dependent claims 2–6, 8–11, 14, and 19–33 as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,64 is therefore respectfully requested.

III. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Pourahmadi et al. US 6,440,725

Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Pourahmadi et

al. US 6,440,725. Claim 7 depends directly from independent claim 1, which has been demonstrated above to be nonobvious. As any claim depending from a nonobvious claim is also nonobvious, claim 7 is, therefore, nonobvious. Withdrawal of the rejection of dependent claim 7 as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Pourahmadi et al. US 6,440,725 is respectfully requested.

IV. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Matsudaira et al. US 4,448,493

Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Matsudaira et al. US 4,448,493. Claim 12 depends directly from independent claim 1, which has been demonstrated above to be nonobvious. As any claim depending from a nonobvious claim is also nonobvious, claim 12 is, therefore, nonobvious. Withdrawal of the rejection of dependent claim 12 as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Matsudaira et al. US 4,448,493 is respectfully requested.

V. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Norman et al. US 6,329,357

Claims 15 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Norman et al. US 6,329,357. Claims 15 and 16 depend either directly or indirectly from amended independent claim 1, which has been demonstrated above to be nonobvious. As any claim depending from a nonobvious claim is also nonobvious, claims 15 and 16 are, therefore, nonobvious. Withdrawal of the rejection of dependent claims 15 and 16 as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Norman et al. US 6,329,357 is respectfully requested.

VI. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al.

WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Beers

et al. US 5,508,273

Claims 17 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Beers et al. US 5,508,273. Claims 17 and 18 depend either directly or indirectly from amended independent claim 1, which has been demonstrated above to be nonobvious. As any claim depending from a nonobvious claim is also nonobvious, claims 17 and 18 are, therefore, nonobvious. Withdrawal of the rejection of dependent claims 17 and 18 as being unpatentable over Knapp et al. WO 98/45481 in view of Yon-Hin et al. US 6,440,645 and further in view of Beers et al. US 5,508,273 is respectfully requested.

VII. Allowable subject matter.

The Examiner has stated that claim 13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. New independent claim 63 includes the limitations of original independent claim 1 and claim 13, which depended directly from claim 1. No new matter has been added by the amendment.

Conclusion

For the foregoing reasons, Applicants believe all the pending claims are in condition for allowance and should be passed to issue. If the Examiner feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned attorney.

Respectfully submitted,



Ann C. Petersen
Reg. No. 55,536

CALIPER LIFE SCIENCES, INC.
605 Fairchild Drive
Mountain View, CA 94043
Direct: 650-623-0667
Fax: 650-623-0504
ann.petersen@caliperLS.com

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Signed:

